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West European Gas Prospects: Limiting Soviet Opportunities

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An Intelligence Assessment

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May 1985

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West European Gas Prospects: Limiting Soviet Opportunities [redacted] 25X1

An Intelligence Assessment

This paper was prepared by [redacted] 25X1
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West European Gas Prospects: Limiting Soviet Opportunities

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Key Judgments

Information available as of 24 April 1985 was used in this report.

Despite the availability of significant indigenous resources in Western Europe, the current gas surplus, together with Soviet marketing efforts, could prevent or delay development of projects needed to meet West European demand requirements in the 1990s and beyond. Although we expect the supply cushion to erode gradually, market forces may not adequately encourage investors to make the huge capital commitments necessary to develop alternative supplies promptly. As a result, Moscow, as the lowest cost supplier with spare export capacity, will have a golden opportunity to increase its gas sales in Western Europe.

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Failure to find acceptable alternatives to Soviet gas could force some West European countries to abandon their 1983 International Energy Agency (IEA)/Organization of Economic Cooperation and Development (OECD) commitment to limit gas imports from the Soviet Union. If substantial progress on the development of indigenous Western gas resources is not achieved over the next few years because of weak demand, the high price of new gas, or stringent tax structures, market realities dictate that Western Europe will purchase additional Soviet gas. Under these circumstances, we believe continental Western Europe could depend on Soviet gas for about 35 percent of its gas consumption in 2000, and about 60 percent in 2010. By the year 2000, gas exports at this level could give Moscow annual hard currency earnings, in current dollars, three to four times the 1984 level of nearly $4 billion. By the year 2010, hard currency earnings could increase to $25-28 billion.

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To meet their IEA/OECD commitment and limit Soviet sales opportunities, Western Europe has several options:

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- *Proceed with development of indigenous gas resources.*

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- *Institute or maintain realistic gas pricing policies, especially in the United Kingdom.* 25X1 25X1

- *Build a gas pipeline linking the United Kingdom and the continent.* 25X1 25X1

- *Internalize all costs associated with the purchase of Soviet gas.* 25X1 25X1

Although no single step would be adequate, a combination of actions similar to these together with purchases from other non-OECD sources could help prevent further Soviet inroads. 25X1

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In addition to steps to limit future dependence on Soviet gas, comprehensive regional planning and cooperation could minimize the impact of a potential gas supply disruption. Moreover, we believe awareness of such planning might discourage gas exporters from even attempting an embargo. Our simulations of the gas distribution system suggest that in 1990 a combination of surge production, interruptible contracts, storage, and the integrated gas network can meet most of the demand arising from a gas disruption under existing supply arrangements. A simultaneous Soviet and Algerian embargo lasting six to 12 months, however, would severely strain the gas network, deplete storage, and leave Europe extremely vulnerable to any additional supply problems. Until West European governments view gas supply availability in a regional strategic perspective, the coordination required to reduce economic dislocations of a supply interruption is highly unlikely.

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Table 1
West European Gas: 1984 Production, Consumption, and Imports [a]

Billion cubic meters (except where noted)

	Production	Consumption	Gross Imports			
			Total	Source	Amount	*Percent of Total Consumption*
Total	**176.8**	**219.0**	**113.9**	**Netherlands**	**34.6**	**16**
				USSR	**29.6**	**14**
				Norway	**29.4**	**13**
				Algeria	**18.8**	**9**
				Libya	**1.4**	**NEGL**
Austria	1.0	4.5	3.0	USSR	3.0	67
Belgium/Luxembourg		9.1	9.1	Netherlands	5.3	58
				Norway	2.1	23
				Algeria	1.6	18
Denmark	0.1	0.1				
Finland		0.8	0.8	USSR	0.8	100
France	6.5	27.9	23.1	Algeria	8.8	32
				Netherlands	7.3	26
				USSR	4.6	16
				Norway	2.4	9
Greece	0.1	0.1				
Italy	13.1	31.9	19.7	USSR	7.7	25
				Algeria	6.9	20
				Netherlands	4.7	14
				Libya	0.4	1
Netherlands [b]	70.0	36.5	3.5	Norway	3.5	10
Norway [b]	29.4					
Spain	NEGL	2.6	2.5	Algeria	1.5	58
				Libya	1.0	38
Switzerland		1.0	1.0	Netherlands	0.8	80
				Norway	0.2	20
United Kingdom	38.3	51.6	13.3	Norway	13.3	26
West Germany	18.3	52.9	37.9	Netherlands	16.5	31
				USSR	13.5	26
				Norway	7.9	15

[a] Consumption minus production may not equal imports, because of losses in production and transmission, exports and reexports, and/or storage programs.
[b] Net exporter.

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West European Gas Prospects: Limiting Soviet Opportunities

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Introduction

For some West European countries to meet their IEA/OECD commitment to avoid increasing dependence on Soviet gas imports, decisions to develop new indigenous gas supplies must be made soon. Reduced natural gas demand and a surplus of supplies in Western Europe, however, have sharply reduced incentives to enter into new and sometimes expensive contracts. In our judgment, the recent British decision not to purchase gas from Norway will postpone development of Norwegian gas as plans for the Sleipner field are at least temporarily put on hold and Oslo directs its attention to oil resources. Undeveloped gasfields in the North Sea are expected to be costly and to have leadtimes as long as 10 years. If West European countries fail to develop new gas resources, Moscow will be well placed—given its abundant gas reserves, pricing flexibility, and the ability to deliver gas with relatively short leadtimes—to capture any growth in West European gas demand in the 1990s and beyond.

Recent Gas Market Trends

In response to the price shocks of 1979-80 and the subsequent economic recession, total West European gas demand declined by over 5 percent between 1979 and 1982, but that trend now appears to have been reversed. Consumption rose in 1983, and preliminary estimates for 1984 show that natural gas demand in Western Europe continued its strong growth, rising about 10 percent over year-earlier levels (table 1). Although the demand revival was due in part to the beginning of European economic recovery, much of the increase resulted from substitution for residual fuel oil as its price rose in response to the UK coal strike. In addition, the political resolution of longstanding contractual problems with Algiers allowed Italy to begin importing substantial quantities of Algerian gas.

Almost one-fourth of all gas consumed in Western Europe in 1984 is estimated to have come from Algeria and the Soviet Union, although some countries were more dependent on Soviet imports than others. For example, all gas consumed in Finland is purchased from the Soviet Union, and Austria depends on Soviet gas for 70 percent of its needs. Italy, West Germany, and France also rely heavily on Soviet gas. The United Kingdom imports no Soviet gas, but plays a major role in gas developments on the continent.

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Gas Supply and Demand in the United Kingdom

Although the UK gas system is isolated from the rest of Europe, it is in major competition with the continent for Norwegian gas. With its recent rejection of the proposal by British Gas Corporation (BGC) to purchase gas from Norway's Sleipner field, the UK Government has acted on the belief that it will be able to produce sufficient quantities of gas to meet most of anticipated demand. London recognizes that it may still have to import some gas, but apparently believes that it can quickly line up supplies—at favorable prices—once it has a better idea of indigenous production capabilities. If the United Kingdom's optimism over its indigenous production potential is not realized, London will have to reenter the market in search of additional gas, bidding up prices and potentially draining supplies from continental purchasers.

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The government and industry forecasts we examined all had a similar view of future UK gas demand (table 2). Most of the anticipated growth is expected to take place by 1990 when gas use is projected to reach 57-60 billion cubic meters (bcm) per year. After 1990, gas demand is projected to remain relatively flat. We agree with these forecasts and believe that demand will level off after 1990 as a result of saturation of the domestic market.

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In contrast to the demand outlook, great uncertainty surrounds future UK domestic output. This uncertainty is reflected in the wide range of current production

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The IEA/OECD Gas Agreement

In May 1983, the ministers of the International Energy Agency (IEA) and the Organization for Economic Cooperation and Development (OECD) agreed on several policy goals regarding future natural gas plans:

- *The ministers agreed to avoid situations in which imports of gas could weaken energy supply security and overall economic stability.*
- *Noting that existing gas contracts were insufficient to cover expected gas demands by the mid-1990s, the ministers recommended that steps be taken to ensure that no one producer exercise monopoly power over IEA or OECD countries, and that no member country become unduly dependent on a single source of gas imports.*
- *Member countries were urged to seek future gas supplies from secure OECD sources, and to develop economically indigenous gas resources, particularly in the North Sea.*
- *The ministers agreed to take measures designed to strengthen their governments' abilities to deal with gas supply disruptions.*

The United States pushed to limit imports from a single source to a 30-percent share of consumption, although that limit was not specifically prescribed in the ministerial agreement. Timely development of Sleipner, Troll, and other North Sea gasfields should have been sufficient to prevent Western Europe from exceeding the 30-percent import level during the remainder of this century. Market forces, the British decision not to purchase Sleipner gas, the high cost of developing Troll, Norwegian tax policy, and Soviet marketing strategy, however, are all combining to delay development. In the absence of a renewed commitment to restrict Soviet imports, it seems unlikely that Western Europe will be able to limit its dependence on Soviet gas to the level desired by the United States in the IEA/OECD agreement. [redacted]

estimates, which place 1990 gas output at 41-80 bcm (table 3). The range widens to 33-91 bcm for the year 2000. All of these estimates make different assumptions about the rate of decline of productive capacity from currently producing fields, development of nonproducing fields, reserve discoveries, infrastructure expansion, and price. Many of these estimates are also likely to have been influenced by institutional positions on the advisability of future gas imports. Nevertheless, with the exception of BP and Gaffney Cline forecasts, all show a level of UK gas production in the 1990s insufficient to meet the expected level of demand. [redacted] 25X1

Even the capacity expansion projected by most forecasters will require a major development effort. [redacted] output from currently producing fields will decline to about 20 bcm per year in the mid-1990s. As a result, the United Kingdom will have to develop more new productive capacity over the next 10 years than was developed during the 1970-80 period for output to remain above 40 bcm. Because much of this capacity will probably have to come from smaller, more expensive fields, this will require a major development effort. [redacted] 25X1 25X1 25X1

These projections for UK gas demand and supply suggest that import demand could rise to nearly 20 bcm by 2010 (table 4). In extending our forecast to 2010, we have assumed a constant level of demand and incorporated a decline in indigenous production of just under 1 percent per year after the year 2000. In our judgment, the United Kingdom will have to continue to import natural gas throughout this period. Supplies from the Norwegian Frigg field already under contract should be sufficient to cover import requirements through the early 1990s, but Frigg's output is expected to decline sharply beginning in 1993, requiring new import arrangements. BGC maintains that even the combined production of the 18 domestic fields under negotiation will not be enough to fill the supply gap likely to emerge after 1993. [redacted] 25X1

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Figure 1
North Sea/Norwegian Sea Oil and Gas Fields

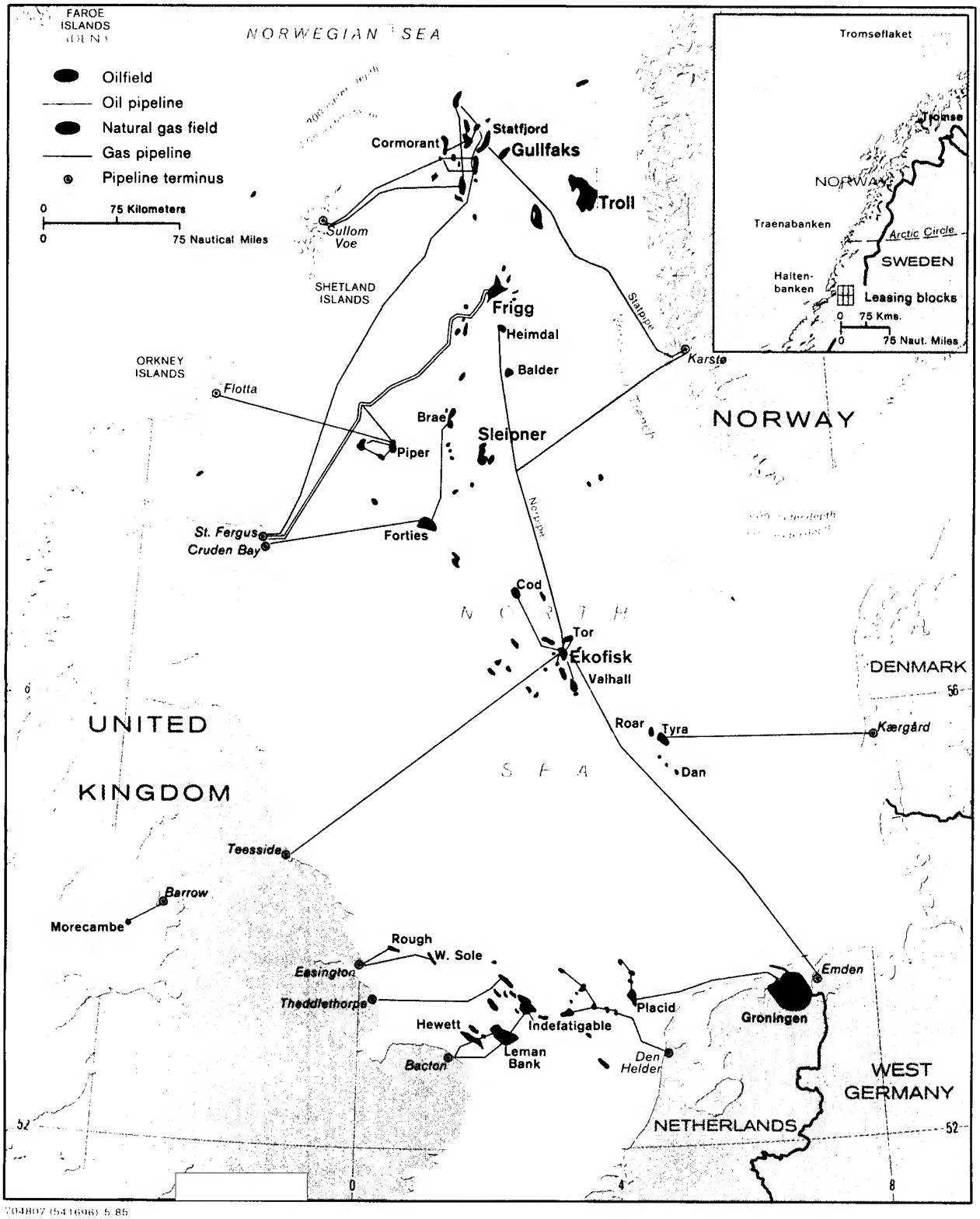

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Table 2
United Kingdom: Estimated Gas Demand, 1990 and 2000 [a]

	1990	2000
BGC	57.9	57.9
Wood Mackenzie	56.8	64.1
BP	56.8	56.3
Esso	56.3	59.4
Conoco	59.9	58.9
Statoil	53.7	57.9
Gaffney Cline	59.9	63.0

[a] *Billion cubic meters.*

Table 3
United Kingdom: Estimated Indigenous Gas Production, 1990 and 2000 [a]

	1990	2000
BGC	49.6	45.5
Wood Mackenzie	47.5	43.4
BP	60.5	63.0
Esso	43.9	47.5
Conoco	47.5	39.3
Statoil	42.4	33.1
UKOOA [b]	41.3	51.8
Gaffney Cline	79.6	91.0

[a] *Billion cubic meters.*
[b] UK Offshore Operators Association.

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Only a price increase sufficiently large to hold demand below projected levels and boost domestic supplies significantly will prevent the United Kingdom from requiring additional imports. We believe that the BP production estimates are based on the assumption that such an increase will be forthcoming. Should London wish to avoid hiking prices by importing additional gas, insufficient time may be available to line up supplies from Norway since Sleipner and Troll are estimated to take six and 10 years, respectively, to develop. The Sleipner rejection may reduce Oslo's interest in engaging in a new round of extended negotiations with the United Kingdom and may also reduce its willingness to be flexible on price.

The only alternative source of imports open to the United Kingdom is the possibility of gas imported from the continent via a pipeline. Such a line could probably be built within a year or two, and would permit the United Kingdom to purchase Dutch or, ultimately, Soviet gas flowing into Western Europe. Although there are no plans for such a pipeline, discussions between BGC and the Dutch firm Gasunie over the possible purchase of Dutch gas have been reported in the trade press. Under these circumstances, the United Kingdom becomes an integral part of the continental market and has to compete with other buyers for all available supplies. Moreover, the projected gas shortfalls offer the Soviet Union another opportunity for expanding exports. If Moscow could tap into this market, Soviet supplies could account for one-fifth of UK consumption in 2000 and nearly 30 percent by 2010.

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Gas Supply and Demand in Continental Western Europe

We believe the present surplus of natural gas supplies on the continent will persist until the early 1990s. Although total gas demand is expected to grow by 20 bcm to nearly 190 bcm, the increase in the major gas consuming countries during the remainder of the 1980s can be met through existing supply commitments. More than 40 bcm, however, may be needed to cover demand requirements in these countries by 2000, despite the recent Dutch decision to continue providing about 30 bcm per year of exports for 10 years or so beyond earlier contract termination dates. In addition to demand growth in the major gas consuming countries, some other countries (Austria, Finland, Greece, and Turkey) that have up to now not been large consumers of gas are now developing domestic markets. We believe the Soviet Union is consciously trying to develop gas markets in these

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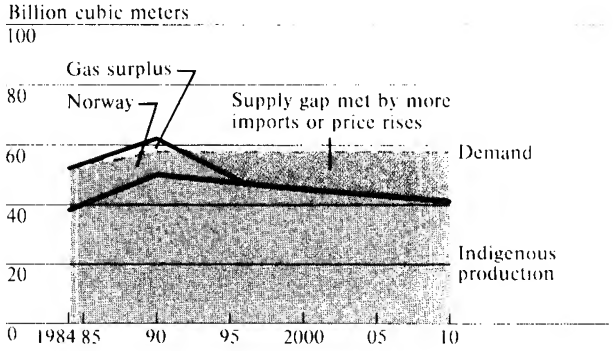
Table 4
United Kingdom: Gas Supply and Demand Balance, 1990, 2000, and 2010 [a]

	1990	2000	2010
Demand	58	58	58
Supply	50	45	41
Required imports	8	13	17

[a] *Billion cubic meters.*

Figure 2
Gas Supply and Demand in the United Kingdom, 1984-2010



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areas. As a result, although few of these potential requirements are yet covered by formal contracts, in our judgment, any consumption increase in these countries will be met in large part by Soviet gas.

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Natural Gas Demand. As a result of our review of recent industry and government forecasts, we expect continental West European gas use will grow on average about 1 to 2 percent per year, amounting to about 220 bcm in 2000 and over 250 bcm in 2010 (table 5). Most of the growth in gas consumption is expected in the residential/commercial and industrial sectors, rather than in electricity generation:

- Revised demand forecasts suggest that *West Germany* may be entering a period of relatively strong growth. Forecasts made last year estimated West German gas demand in 1990 at about 53 bcm, but recent data indicate that 1984 demand had already reached that level. If demand grows at the level we have projected, it could reach 58 bcm in 1990, although previously that level was not anticipated until the year 2000.

- While *French* gas demand is expected to continue to increase, recent government and industry forecasts have been reduced. Demand in 1990 is now projected at about 30 bcm, whereas a year ago it was estimated at 35 bcm. Consumption is now not expected to reach 35 bcm until the year 2000. These changes stem in part from pricing decisions made in Paris. Consumer gas prices were increased 13 percent in 1984 and under present government policy will rise at the annual rate of inflation. Electricity prices, however, were increased only 5 percent in 1984, and in the future are to rise at 1 percentage point less than the inflation rate. Gas imports from the USSR and Algeria could satisfy about two-thirds of French demand in 1990 and 2000.

- There has been little change in forecasted gas consumption levels for *Italy* in the past year. Italy is expected to consume about 38 bcm in 1990, of which about two-thirds will be imported from Algeria and the Soviet Union.

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Among the smaller or nontraditional gas-using continental countries, Austria, Greece, Turkey, and Spain account for over 70 percent of both the projected 20 bcm in demand in 1990, and the 31 bcm in 2000. Austria already receives all its imported gas from the Soviet Union. Greece and Turkey are considering Soviet gas imports, but, if contracts fail to be signed, they probably will remain only marginal consumers of gas. Spain plans to continue its imports from Algeria, albeit at a reduced level, as it mounts an aggressive domestic exploration program.

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The Sleipner Deal

Norway's Sleipner gasfield was discovered in 1981. Preliminary agreement between Statoil, the Norwegian state oil company, and British Gas Corporation (BGC) for the sale of about 12 bcm annually over 20 years was reached in early 1984 after about two years of negotiations. BGC viewed this gas as a replacement for current imports from Norway which are expected to begin declining in the early 1990s. Ongoing disagreement between Norwegian and UK authorities, however, ultimately led to official British rejection of the proposal in early 1985. Had the deal been approved, another five to six years would have been necessary to bring the initial flow of gas on stream. First deliveries had originally been planned for 1990, with plateau output reached by 1994.

The sources of disagreement leading to collapse of the deal concerned several basic issues:

- *The price and volume of the dry gas.*
- *The route for a pipeline to transport associated liquids.*
- *Eventual taxation of the pipeline.*
- *A guaranteed UK share of the construction contracts.*
- *The UK domestic gas reserves situation.*
- *The impact on the UK balance of payments and tax revenues that would have resulted from importing gas rather than producing it domestically.*

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In response to London's initial objections, Statoil and BGC negotiated a reduction in annual volumes to 10 bcm. According to trade speculation, Oslo is also believed to have been prepared to yield marginally on price. Norway refused, however, to give in to London's demands on the pipeline route for the liquids or to guarantee UK firms a share of development contracts. Ultimately, London was influenced by the belief that it might be able to meet future domestic requirements from its own gas reserves and avoid the consequences on its balance of payments and tax revenues resulting from Norwegian gas imports.

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Natural Gas Production. West European gas supplies available to the continent will probably be in decline by 1990 unless new gasfields are developed (table 6). Two OECD countries will play a key role in determining the amount of indigenous gas production available to help meet demand requirements:

- *Dutch* gas production and export policy has been in flux in recent years. As late as 1983 The Hague intended to completely phase out gas exports by the year 2000 to conserve gas for domestic use. According to Embassy and press reporting, however, the Dutch have authorized additional exports and have begun to renew their customers' contracts for about another 10 years. The Hague has already made available sufficient gas to ensure that exports remain at about 30 bcm per year from the early 1990s to just beyond the turn of the century, when exports are to be phased out.
- *Norwegian* production and exports will depend in large part on whether the Sleipner and Troll fields are developed. If both are fully developed, it is estimated that output could be as high as 50-55 bcm per year. Their development, however, depends on whether Oslo offers either Sleipner or Troll at a price acceptable to potential buyers.

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Import Requirements. Our estimates of indigenous continental gas production suggest that European countries will continue to be large importers, requiring more gas after 1990 than current contracts provide. Current contracts with OECD members are expected to continue at under 50 bcm per year through 2000 when they will begin to phase out.

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Forecasting Gas Demand and Supply

Great uncertainty surrounds long-term gas demand and supply forecasts. The success of past long-term forecasts has been minimal, and recent projections remain vulnerable both to the shortcomings of past projections and the absence of current, complete data. The threat of unexpected energy supply disruptions and uncertainties regarding economic growth, price trends, and the responsiveness of supply and demand to price changes all hinder forecasting. Moreover, small changes in economic growth and price can cause substantial modifications in projected energy requirements.

Methodology

To assess gas market conditions through the remainder of the century and to the year 2010, we examined an array of long-term forecasts.

We examined the forecasts for reasonableness of assumptions concerning economic growth and energy prices. In deriving a base or summary case, we attempted to represent the consensus opinion, tempered by our own judgments.

Key Assumptions

Prices. *Our supply/demand projections assume real oil prices decline through 1990, remain constant in real terms to 1995, and rise thereafter at 2 percent per year through the year 2010. In general, the price of other fuels, including gas, is expected to move in line with oil prices. Should oil prices slide, we would expect gas prices to fall as well, thus reducing pressures to conserve and probably encouraging some new demand.*

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Growth. *West European economic growth is projected at an average annual rate of 2 to 2.5 percent to the year 2010. Total West European gas use is expected to grow, on average, by about 1 to 2 percent per year through 2010.*

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Sensitivity Analysis

Because of the uncertainties associated with these key variables, we estimated the sensitivity of gas demand to variations in economic growth and energy prices

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- *Economic growth—a 1-percentage-point increase in average economic growth rates over the rest of this century could increase 1990 gas demand by 7 percent or 17 billion cubic meters. By the year 2000, gas demand would be about 15 percent—42 bcm—above our estimated demand level.*

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- *Energy prices—the rate of increase and relationship to prices of competing fuels will influence gas demand. If gas prices fell 10 percent below their present level relative to oil prices, West European demand could be 3 percent—7 bcm—above our 1990 projection, and 5 percent—14 bcm—above our average current estimate for the year 2000.*

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Currently, non-OECD gas supply contracts—including Soviet contracts—are expected to provide from 67 bcm to 76 bcm per year in both 1990 and 2000, and are assumed to be renewed at least through 2010. (table 7):

- *1990.* Supplies are likely to be adequate to cover demand. The larger consumers will still have excess supply under current contracts. We expect the smaller consumers to cover their needs through new contracts with the Soviet Union.

- *2000.* The amount that would need to be covered by new contracts rises to about 33-42 bcm over the 1990s. Again a significant portion of the shortfall is in the smaller consuming countries. West Germany, France, Italy, and Belgium—the continent's four largest importers—will need to contract for about 8-17 bcm of additional supplies.

- *2010.* A supply shortage of as much as 114 bcm could develop after the turn of the century. The four largest importers will account for about 75-84 bcm of the total.

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Table 5
Continental Western Europe: Gas Demand, 1984, 1990, 2000, and 2010 [a]

	1984 [b]	1990	2000	2010
Total	**167.4**	**188.7**	**221.8**	**252.3**
Major consumers				
West Germany	52.9	57.8	67.1	77.9
France	27.9	30.5	35.4	41.1
Italy	31.9	38.5	44.7	51.9
Belgium and Luxembourg	9.1	10.0	11.6	13.4
Netherlands	36.5	32.0	32.0	32.0
Others [c]	**9.1**	**19.9**	**31.0**	**36.0**
Austria	4.5	6.0	7.0	
Denmark	0.1	2.0	3.0	
Finland	0.8	2.0	3.0	
Greece	0.1	2.0	4.0	
Spain	2.6	4.3	5.0	
Sweden	NEGL	0.6	1.5	
Switzerland	1.0	1.0	1.5	
Turkey	NEGL	2.0	6.0	

[a] *Billion cubic meters.*
[b] Estimated.
[c] Others assumed to grow at 1.5 percent annually between 2000 and 2010.

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We expect the Soviets to continue to market their gas aggressively in the West, maintaining a tough bargaining stance but remaining flexible on prices. Because of the low cost of Siberian gas and the Soviets' ability to expand their pipeline system, Moscow will have the option of offering additional supplies at low prices. With spare capacity in existing pipelines, competitive pricing by Moscow could capture incremental growth in West European import demand and limit access of potential Middle Eastern suppliers to the European market. The outlook for such sales would, of course, depend on market conditions and the willingness of prospective Western buyers to become more dependent on Soviet gas.

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Table 6
Continental Western Europe: Estimated Indigenous Gas Production, 1984, 1990, 2000, and 2010 [a]

	1984	1990	2000	2010
West Germany	18.3	17.0	14.0	13.0
France	6.5	3.5	1.5	0.7
Italy	13.1	13.0	12.0	11.0
Belgium and Luxembourg				
Netherlands	70.0	63.0	63.0	32.0
Others [b]	1.2	3.5	6.1	6.9
Subtotal	**109.1**	**100.0**	**96.6**	**63.6**
Norway [c]	29.4	28.0	16.0	8.0
Total Western Europe	**138.5**	**128.0**	**112.6**	**71.6**

[a] *Billion cubic meters.*
[b] Includes Austria, Denmark, Greece, and Spain.
[c] Excludes Sleipner and Troll.

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Alternatives for Meeting Demand. Because of the different possible approaches for covering a supply shortfall, we have developed three scenarios that delineate the range of options available to Western Europe (figure 4). All the scenarios utilize the consensus gas demand forecast developed from our review of government and industry demand projections. In addition, each assumes that Dutch contracts will be renewed at present levels through 2000 before being allowed to lapse. We also assume that the smaller or nontraditional users develop their gas markets and turn first to the Soviets to cover their requirements. The scenarios differ in the amount of anticipated indigenous production and, consequently, in the level of projected imports.

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Case I—Maximum Indigenous Development. In this scenario, although we assume that a high level of Norwegian production capacity is developed, there is still substantial continental demand for non-OECD

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Table 7
Estimated Continental Natural Gas Import Requirements, 1984, 1990, 2000, and 2010 [a]

	1984 [b]	1990	2000	2010
Continental demand	167.4	188.7	221.8	252.3
Continental supply (excludes Dutch and Norwegian exports)	75.6	69.0	65.6	63.6
Total import demand	91.8	119.7	156.2	188.7
OECD supplies	49.6	47.0	47.0	8.0
Netherlands	33.5	31.0	31.0	
Norway	16.1	16.0	16.0	8.0
Non-OECD supplies	50.6	67-76	67-76	67-76
Algeria and Libya	18.2	25-27	25-27	25-27
USSR	32.4	42-49	42-49	42-49
Shortfall (surplus)	(8.4)	5.7-(3.3)	33.2-42.2	104.7-113.7

[a] *Billion cubic meters.*
[b] Estimated.

gas imports at the turn of the century and to the year 2010. Underlying this scenario is the assumption that the continent contracts for 5 bcm of Sleipner gas beginning in 1995, rising to 10 bcm in 2000 and 2010.[1] In addition, we assume continental buyers contract for 15 bcm of Troll gas effective in 2000, with volumes rising to 30 bcm by 2010, and increase their purchases of Algerian gas by 10 bcm in 2000 and 2010. *For this scenario to take place, the United Kingdom must remain self-sufficient and the continent must conclude a contract for the purchase of Sleipner by about 1990. In addition, an approach must be found to make Troll more competitive with Soviet gas, and the Algerians must modify their gas export policies to be perceived as reputable trading partners.*

With these favorable assumptions, the continent's gas supply and demand are roughly in balance in 2000. By 2010, however, the continent may face a shortage of as much as 55-64 bcm. We assume that this shortfall is fully covered by the Soviet Union. Under these circumstances, dependence on Moscow is held to about 20 percent of the continent's gas needs in the year 2000, but rises to more than 40 percent by 2010. As a result of increased exports, Soviet hard currency earnings from gas could almost double by 2000 and might exceed $16 billion in 2010. If continental buyers do not purchase the new 10 bcm of Algerian gas projected to be offered in 2000 and 2010, Soviet sales could increase further and generate another $1.4 billion in hard currency earnings in 2000 and $1.7 billion in 2010. Dutch exports might continue at some reduced level through the year 2010 or new gas from areas like the northern Norwegian fields in the Haltenbanken or Tromsoflaket areas may be flowing by that time, reducing the continent's need for imported gas. For this scenario, however, we have ruled out these alternatives because of insufficient information on development prospects and potential volumes.

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Case II—Moderate Indigenous Development. This scenario assumes that Norway fully develops only the Sleipner field for the continental market, delivering 5 bcm in 1995 and 10 bcm beginning in 2000. In this case, development of gas from Troll is deferred beyond our time horizon. Under these assumptions, continental purchasers confront a gas supply gap of 23-32 bcm in 2000 and 95-104 bcm in 2010. Although rising prices would reduce demand considerably, we expect that any remaining shortfall would be fully covered by the abundant gas reserves of the Soviet Union. Moscow would be supplying over 30 percent of the continent's gas in 2000 and over 55 percent by 2010. At these volumes, Soviet gas exports would earn Moscow more than $10 billion in 2000 and more than $25 billion in 2010.

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Case III—Minimum Indigenous Development. In this scenario, neither Sleipner nor Troll is sold to continental users. As a result, purchasers face a supply gap of 33-42 bcm in 2000 and 104-114 bcm in 2010. In this case, as in the previous ones, we expect that the shortfall would be fully met by gas exports from the

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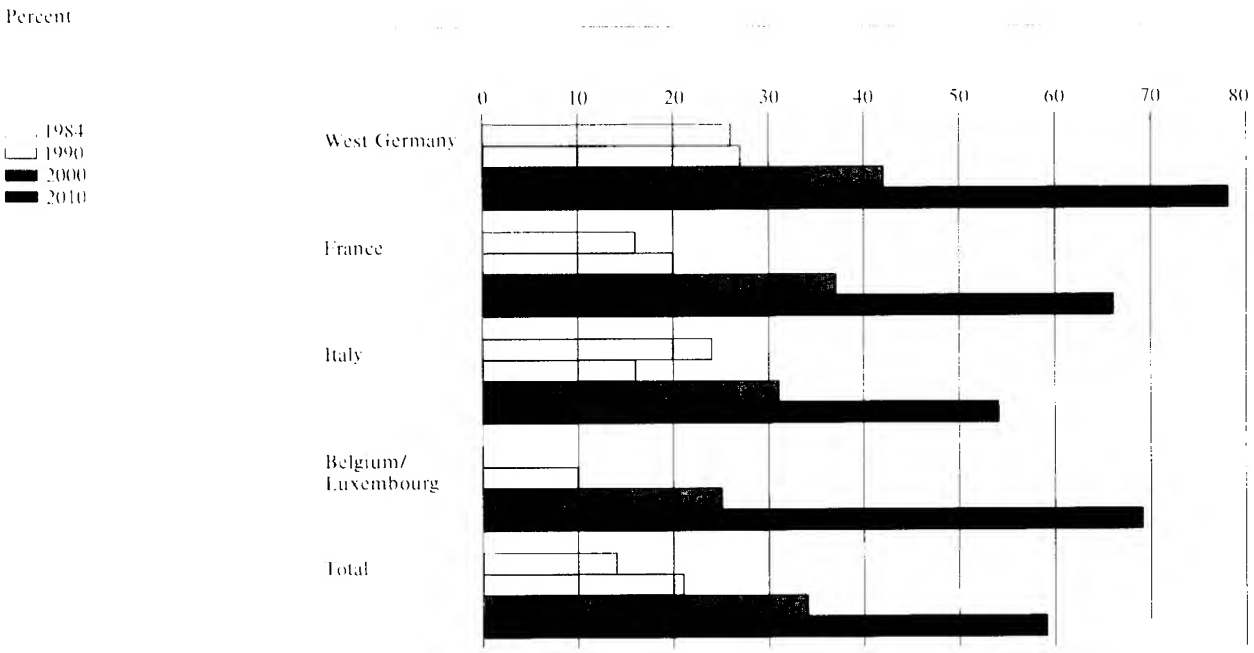
[1] This case assumes that steps are taken to reduce the carbon dioxide level of Sleipner gas to make it compatible with continental needs.

Figure 3
Continental Western Europe: Potential Dependence on Soviet Gas[a]



[a] Maximum potential dependence, assuming uncontracted demand is covered by Soviet gas.

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Soviet Union, implying Soviet earnings of $11-13 billion in 2000 and close to $30 billion in 2010. This scenario would occur if the United Kingdom were to end up purchasing Sleipner gas to meet a domestic shortfall and no acceptable approach could be found to make Troll more competitive with Soviet supplies.

Unless Troll can be made more competitive with Soviet gas by reducing or sharing costs, we believe case I is extremely unlikely. Both cases II and III are realistic under current market conditions, in our judgment.

Alternative Development Strategies for North Sea Gas
With the collapse of the initial effort to sell gas from the Sleipner field, uncertainty continues as to where gas from that field, and from Troll, may eventually find a market. Regardless of how these fields are developed, physical, contractual, and political stumblingblocks ensure that the process will be lengthy. Furthermore, the cost to the consumer of gas from either Sleipner or Troll is likely to be higher than the current price of about $3.60 to $4 per million Btu for imported gas supplies.

Sleipner. a number of alternative options for Sleipner have been considered, any one of which we believe might still form the basis for its eventual development:

- Sleipner to the United Kingdom, as proposed by BGC, by a new pipeline or through the existing Frigg system. According to industry estimates, the

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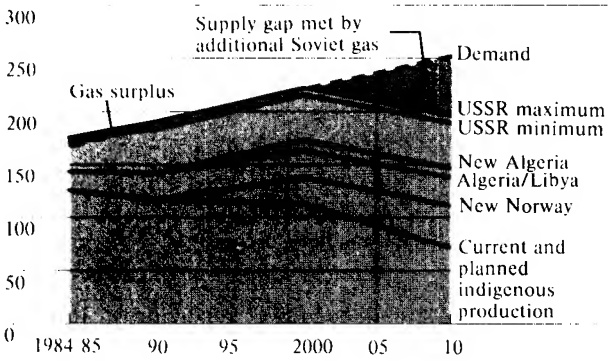
Figure 4
Continental Western Europe: Natural Gas Supply and Demand, 1984-2010

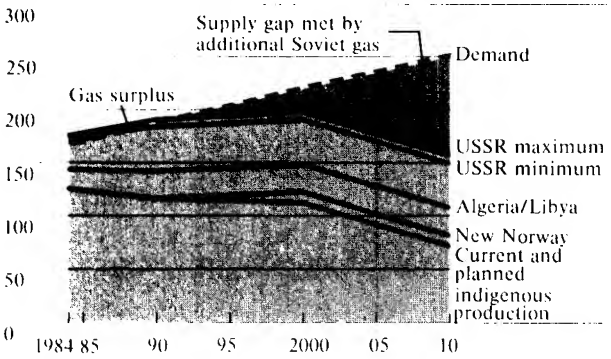
Billion cubic meters

Case 1
Maximum Indigenous Development



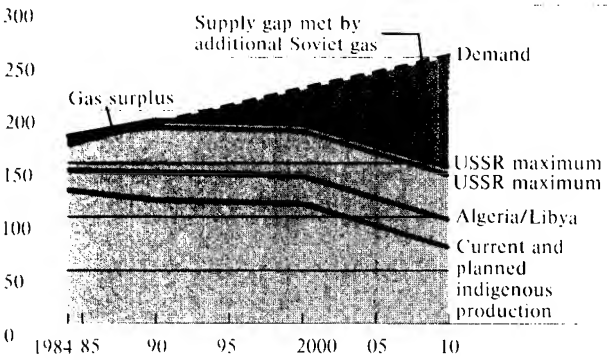
	1984	1990	2000	2010
Continental demand	167.4	188.7	221.8	252.3
Continental supply [a]	75.6	69.0	65.6	63.6
Import demand	91.8	119.7	156.2	188.7
OECD supplies	49.6	47.0	72.0	48.0
Netherlands	33.5	31.0	31.0	
Norway [b]	16.1	16.0	41.0	48.0
Non-OECD supplies	50.6	67-76	77-86	77-86
Algeria and Libya [c]	18.2	25-27	35-37	35-37
USSR	32.4	42-49	42-49	42-49
Shortfall (surplus)	(8.4)	5.7-(3.3)	7.2-(1.8)	54.7-63.7

Case 2
Moderate Indigenous Development



Continental demand	167.4	188.7	221.8	252.3
Continental supply [a]	75.6	69.0	65.6	63.6
Import demand	91.8	119.7	156.2	188.7
OECD supplies	49.6	47.0	57.0	18.0
Netherlands	33.5	31.0	31.0	
Norway [d]	16.1	16.0	26.0	18.0
Non-OECD supplies	50.6	67-76	67-76	67-76
Algeria and Libya	18.2	25-27	25-27	25-27
USSR	32.4	42-49	42-49	42-49
Shortfall (surplus)	(8.4)	5.7-(3.3)	23.2-32.2	94.7-103.7

Case 3
Minimum Indigenous Development



Continental demand	167.4	188.7	221.8	252.3
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Import demand	91.8	119.7	156.2	188.7
OECD supplies	49.6	47.0	47.0	8.0
Netherlands	33.5	31.0	31.0	
Norway [e]	16.1	16.0	16.0	8.0
Non-OECD supplies	50.6	67-76	67-76	67-76
Algeria and Libya	18.2	25-27	25-27	25-27
USSR	32.4	42-49	42-49	42-49
Shortfall (surplus)	(8.4)	5.7-(3.3)	33.2-42.2	104.7-113.7

[a] Excludes Dutch and Norwegian exports.
[b] Assumes 5 bcm of Sleipner in 1995, 10 bcm of Sleipner and 15 bcm of Troll in 2000, and 10 bcm of Sleipner and 30 bcm of Troll in 2010.
[c] Assumes 10 bcm additional from Algeria in 2000 and 2010.
[d] Assumes 5 bcm of Sleipner in 1995, 10 bcm of Sleipner in 2000 and 2010, and no production from Troll.
[e] Assumes no production from either Sleipner or Troll is sold to the continent.

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price of gas from Sleipner to BGC was to have been about $4.10 to $4.15 per million Btu. On a heat-equivalent basis, this price is roughly comparable with $23 per barrel oil.

- Sleipner to the continent, in plateau volumes of about 10 bcm per year or more. A new pipeline would need to be built.
- Sleipner to the continent in lesser volumes through the existing Statpipe-Norpipe system. This alternative might not add significantly to continental supplies because of capacity constraints in the Ekofisk-to-Emden line.
- Sleipner to both the United Kingdom and the continent. Of the volumes proposed for purchase by BGC, perhaps half of the total could be routed to the United Kingdom and the remainder to the continent if pipeline capacity were in place.
- Sleipner to the continent through the United Kingdom. This alternative views the United Kingdom as a landbridge to Western Europe, and would require a cross-channel pipeline link for Sleipner gas to reach European consumers.

Troll. Although Troll was discovered in 1981, only now are efforts beginning for the sale of gas from the western section of the field. the field will take at least 10 years to develop. If sales efforts were concluded today, Troll gas would not reach market until 1995 at the earliest. If the protracted Sleipner talks are any guide to the negotiation time required, we believe the date could well slip to after the turn of the century. Several choices for the delivery of Troll gas remain on the drawing boards:

- Troll gas could be sold directly to the continent in volumes as small as 3-5 bcm per year or as much as 30-40 bcm.
- As much as 15 bcm per year could be sold to the United Kingdom.
- Troll gas could be sold to the continent and the United Kingdom.

Norwegian Policy Considerations. In our view, the key to agreement on the sale of Troll gas will be Norwegian marketing flexibility. Oslo will have to accept a less burdensome tax regime for Troll to ensure its development. The longer the delay in making the necessary adjustments, the greater the

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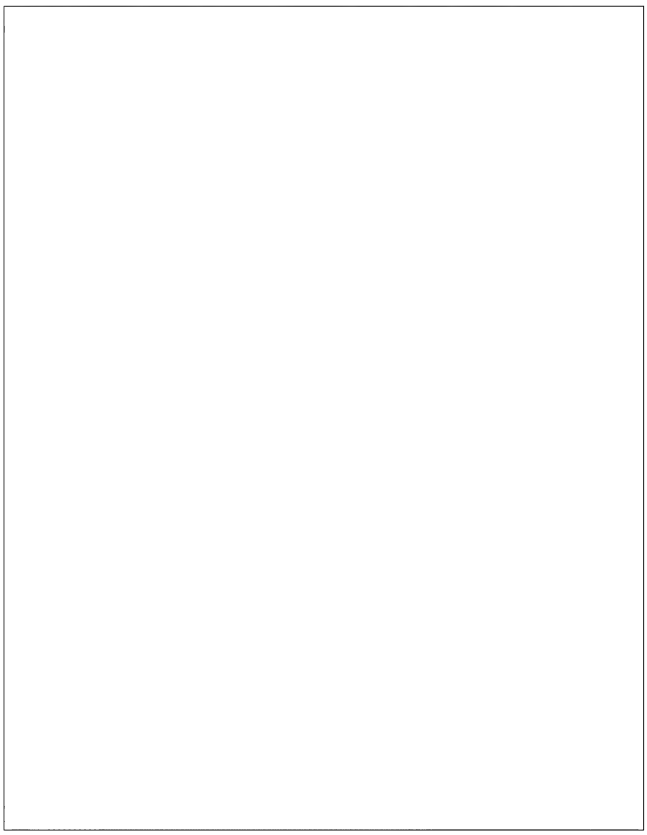

chance that the Soviets will win an increasing share of the West European market by default. Development of Troll and Sleipner are in some ways linked, since some of the proposals call for using the same transportation facilities. In our judgment, however, development of only a portion of the Troll field using relatively small amounts of surplus capacity in existing transmission systems could prevent maximum output levels of 30-40 bcm per year from being economically practical. If initial facility design does not allow for maximum production increases, capacity expansion may not be commercially attractive because of the high cost of new infrastructure that would have to be borne solely by the remaining sections of the field. 25X1

Recent Embassy reporting indicates that Oslo may be completely rethinking gas sales policy. Under consideration is an approach to sell smaller quantities of gas without selling fields in their entirety. For the present, we believe Oslo will adopt a wait-and-see attitude with respect to Sleipner development, in favor of its "oil option." The day after the Sleipner rejection, Norway announced plans to advance work on its Gullfaks oilfield as part of its ongoing effort to maintain a constant level of annual investment in the oil and gas industry. Continued development of its oil resources may temporarily divert Norway's capital resources away from gas. 25X1

In our judgment, a further consideration that might influence Oslo's strategy would be its hope of keeping the United Kingdom isolated from the continent. A cross-channel pipeline would open Norwegian gas to competition with other lower cost supplies. Such a pipeline poses the risk of opening the UK market to Soviet gas, but increased competition might also force Norway to accept lower prices for all its gas and cause Oslo to rethink its whole tax policy. By reserving Sleipner or a portion of Troll for the United Kingdom, Oslo might be able to prevent an integration of West European gas markets. 25X1

Alternative Sources

A number of non-Soviet natural gas export projects are frequently considered as alternative sources of supply for the European market. Because of current European perceptions, the short-term oversupply of gas, hardline marketing attitudes in some exporting countries, and the likely difficulties in securing financing for expensive new capital projects, these plans are unlikely to be realized in time to prevent further inroads of Soviet gas into Western Europe:

- *Algeria* will be able to expand gas exports in the 1990s perhaps by an additional 40-45 bcm per year. Exports of about 10 bcm above current contract amounts should be possible without any significant expansion of infrastructure. In the past, however, Algiers has maintained a hawkish position on both price and volume requirements, even when confronted by weakening market conditions. We believe Algiers's policies have been in large part determined by production considerations—which will limit the amount of gas available to meet supply commitments during the rest of this decade—and by delays in developing new fields. Only recently has Algeria shown some flexibility on volumes and timing of 25X1

deliveries. We believe Algeria will become increasingly responsive to market pressures as gas availability improves and crude oil revenues continue to slide. Past difficulties in dealing with Algiers may nonetheless make Western Europe reluctant to purchase Algerian gas except as a last resort.

- *Iran* has proposed a new pipeline to carry 50 bcm of gas per year via Turkey and Greece to southern Italy. With completion of the Italian gas grid handling Algerian supplies, Iranian gas could move northward into Western Europe. Preliminary estimates suggest that the pipeline would take four years to build. Plans for Iranian exports through Turkey, however, have been around for 20 years, and have repeatedly foundered on political distrust and doubts about economic viability. Furthermore, Soviet gas sales to Greece and Turkey could limit the attractiveness of Iranian gas to the West European market. These two countries are key steppingstones for Middle East gas projects since some gas may need to be sold in transit to minimize delivery costs.

- *Qatar* has considered building a pipeline across Saudi Arabia, Iraq, and Turkey to Italy and other European countries. This proposal is one of many concerning the disposition of over 8 bcm per year of Qatari gas. Variations of this proposal include construction of a pipeline from Qatar to Alexandria, Egypt, with the gas reaching Italy either as liquefied natural gas (LNG) or through a subsea pipeline. This proposal is not expected to be economic for a long time.

- *Iraq* has also proposed a gas pipeline to Western Europe via Turkey, but we believe the quantities of gas involved are too small to justify the large capital outlays required.

- *Nigeria* and *Cameroon* have both explored possible LNG projects, but are unlikely to have the financial resources to complete these programs because of the high costs involved.

- Continuing exploration has led to the discovery of gas in the northern waters off *Norway* in the Haltenbanken, Traenabanken, and Tromsoflaket areas. Reserves from these fields have not yet been declared commercial. Because of their location and the time and expense involved in developing them for market either by pipeline or by LNG carrier, they are not expected to be economic in either Europe or the United States in this century. 25X1

A change in either Algerian attitudes or West European perceptions of the benefits of purchasing gas from Algiers would limit Soviet marketing opportunities. Subsidies of some sort would probably be required to make any other new export project commercially attractive. In the absence of these conditions, Moscow can expect little competition from these alternative sources. 25X1

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The price paid by purchasers of Soviet gas does not, however, include costs that are required to meet the increasing seasonality of demand arising from the increasing proportion of residential and commercial customers. Since Soviet contracts are for base load volumes and do not provide for increased seasonal deliveries, more storage will be needed as the share of Soviet gas rises. Evidence suggests that natural gas storage is expensive. A 1981 German estimate for developing an old gasfield to store 1 bcm of gas, for example, places the facility cost alone at $7.50 per million Btu. Furthermore, in most cases the actual amount of usable gas that can be recovered from a storage facility is well below total capacity, frequently reaching only 50 to 70 percent of total fill. According to some industry estimates, the cost of unrecoverable gas can at times equal facility development costs. Recent industry estimates suggest that storage in abandoned US gasfields raises the price of the stored gas by about $2 to $4 per million Btu. European costs of storage may be similar. We estimate that gas storage costs of this magnitude could add about 40 to 80 cents per million Btu to base load gas prices in contracts with inflexible delivery schedules—like those offered by the USSR. Alternative methods of storing gas in salt dome caverns, aquifers, or abandoned mines are even more expensive.

Interrupting supplies to industrial gas users and drawing on surge capacity are other ways of enhancing flexibility in meeting gas emergencies. Data on industrial gas prices for interruptible contracts in Western Europe indicate that customers are willing to pay a premium of 30 to 90 cents per million Btu to ensure deliveries. This suggests that secure indigenous West European gas supplies should sell at a premium compared with Soviet gas if Moscow were perceived as a potentially unreliable supplier.

Table 8
Estimated Annual Soviet Hard Currency Earnings, 1990, 2000, and 2010 [a] [b]

	1990	2000	2010
Case I	5.7-6.6	6.9-8.0	16.6-19.3
Case II	5.7-6.6	9.7-12.1	23.4-26.2
Case III	5.7-6.6	11.1-13.5	25.1-27.9

[a] *Billion 1984 $.*
[b] These estimates assume nominal gas prices remain constant through 1995 and increase at about 2 percent per year after 1995. These calculations exclude potential Soviet gas sales to such countries as Finland, Greece, and Turkey, since those customers either do not or are not expected to offer hard currency for their gas purchases.

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These preliminary data suggest to us that the true cost of Soviet gas may be about $1 to $1.50 per million Btu above the contract price. We are currently unable to quantify the cost of maintaining surge productive capacity, but this would further add to the hidden costs associated with purchases of Soviet supplies. Even the addition of about $1.50 to Soviet gas prices of $3.45 to $3.60 per million Btu fails to provide a price margin sufficient to induce commercially practical production from Troll under current market conditions and the present Norwegian tax system.

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Contingency Planning

The price paid for non-OECD gas likewise does not include the cost of strategic gas storage that might be required to provide adequate insurance against a disruption and discourage or reduce significantly the impact of a potential cutoff.

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gas storage facilities in Europe should accommodate about 34 bcm of usable gas by 1990:

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- At the end of 1983, *Austria* had 2.3 bcm in usable storage, sufficient to meet current demand for six months. the storage sites allow expansion of this capacity by one-third.

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- *Belgium* has increased its storage facilities, but only enough to accommodate increasing residential load. At the end of 1982, Belgium had 0.4 bcm of gas stored, or enough to accommodate about 4 percent of forecast 1990 demand.

- *France* is actively pursuing a policy of adding to its storage facilities. Total storage at the end of 1983 was 23.6 bcm, which Paris intends to raise to a minimum of 30 bcm by 1990. Of these volumes, however, only half will be recoverable and available to meet contingencies. France's announced goal is to have sufficient usable storage to cover 30 percent of anticipated demand.

- *West German* gas storage capacity amounted to 2.3 bcm at the end of 1982, but is planned to increase to 7 bcm by 1990. These stocks are designed primarily to meet seasonal fluctuations in demand rather than to cope with an emergency.

- *Italy* is increasing its usable storage capacity from 6 bcm to 9.5 bcm by the end of 1985, and to 12 bcm by 2000, equivalent to about 25 percent of expected gas demand in 1990 and 27 percent in 2000. Rome is striving to assure coverage for an emergency interruption of gas supplies from Algeria lasting six months.

- While not yet under consideration as a future storage facility, the Groningen gasfield in the *Netherlands* could serve as a strategic gas reserve.

If all of the storage facilities originally planned are completed, Western Europe may be able to ride out a cutoff of up to a year of non-OECD supplies.

Many European industrial facilities have dual-fired capacity, and, if denied gas, could switch to oil or coal. Moreover, most customers for Dutch gas count on contract flexibility to enable them to purchase additional quantities should the need arise:

- *France* is planning to increase its interruptible contracts from 15 percent of current total gas demand to 20 percent.
- *West Germany's* interruptible gas contracts cover about one-quarter of total industrial demand and about one-half of electric utility gas use. Both would be shed in an emergency.
- During a shortage, *Austria, Belgium,* and *Italy* would also plan to reduce interruptible demand and increase supplies from other sources up to contract or pipeline limits.

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Our detailed simulations of the West European gas distribution system suggest that in 1990 a combination of surge production, interruptible contracts, storage, and the integrated gas network could meet most of the demand arising from a gas disruption under existing supply arrangements. Under present gas distribution policies, however, any Soviet gas embargo during the peak winter months could cause minor gas shortages in certain areas even though the physical distribution system would otherwise be adequate. Even under favorable circumstances, including extensive regional planning and cooperation, a simultaneous Soviet and Algerian embargo lasting six months—in which Algeria might seek economic leverage from Soviet action—would severely strain the West European gas network by the end of the decade. Such an embargo would require peak production from all domestic sources, including the Netherlands. At the end of a joint Soviet-Algerian embargo lasting 12 months, storage would be severely depleted, leaving Europe extremely vulnerable to any additional supply problems.

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Comprehensive regional planning and cooperation could alleviate some of the effects of such major supply disruptions. Moreover, we believe awareness of such planning might discourage gas exporters from even attempting an embargo. Until West European governments view gas supply availability in a regional strategic perspective, the coordination necessary to use effectively Europe's gas system during a disruption is highly unlikely. Implementation of current national West European gas supply emergency plans—which vary widely in scope and depth—could even aggravate shortages in other countries during a major disruption.

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West European Options

We believe several possible steps—in addition to development of indigenous gas resources—could be taken by Western Europe at this time to avoid significantly greater dependence on Soviet gas:

- A more flexible Norwegian tax policy would improve the commercial viability of its North Sea gasfields. Oslo has already displayed considerable flexibility in its negotiations over the sale of Sleipner gas. Even greater concessions, however, will be required to ensure development of Troll, in our judgment. [redacted] Norway is considering tax revisions that would allow accelerated depreciation. We believe this review is a result of company pressure and the Sleipner rejection. In our opinion, revisions of this type would improve prospects for Troll development. Indeed, one company official with a business interest in the field stated last year that accelerated depreciation rules would significantly increase Troll's economic viability.

- Norway should also cultivate the image of a reliable supplier. Strikes in the oil and gas industry that disrupt scheduled deliveries must be minimized and Oslo must ensure that gas commitments are met. European perceptions of the security of Norwegian supplies would be undermined if reservoir problems with the Ekofisk field disrupt gas deliveries. Recent press reports indicate that Ekofisk's production may have to be curtailed or halted during the winter months.

- More realistic gas pricing policies would reduce potential markets for Soviet gas. UK gas prices remain the cheapest in all of Western Europe. As of late 1984, UK industrial gas prices averaged $2.44 per million Btu, compared with continental European prices that ranged from $3.50 to $7.50. Residential consumers pay about $4.50 per million Btu compared to as much as $9 on the continent. Higher prices would help ensure that the United Kingdom minimizes projected import requirements by holding demand below forecast levels and improving the outlook for the expansion of productive capacity. Indeed, higher gas prices could be one of the most effective tools in limiting dependence on Soviet gas. A price path 10 percent above the level used in our projections, for example, could reduce West European demand by about 14 bcm per year by 2000. If contract revisions permitted the reduction to be absorbed by Moscow, projected Soviet gas sales could fall by as much as 30 percent.

- A gas pipeline link from the United Kingdom to the continent would improve overall European gas security by increasing the flexibility of the pipeline grid, eliminate the expense of one or more deepwater North Sea pipelines, and increase both UK and continental competitive leverage in buying any Norwegian gas in the future. Although such an option ultimately opens the UK market for penetration by Soviet gas, we believe the potential benefits of such a move outweigh the cost by enhancing the commercial attractiveness of Norwegian gas. 25X1

- Gas purchasers should factor in the total costs of Soviet gas before buying additional volumes. To improve the competitive position of indigenous OECD gas resources, governments should take steps to ensure that gas companies internalize all costs associated with their purchase of Soviet gas. This includes storage costs and the expense of maintaining surge productive capacity, which will raise the effective price paid for less secure supplies. Some form of subsidy may also be required to improve North Sea development prospects.

- Despite their past difficulties with Algeria, Western Europe should be encouraged to purchase competitively priced Algerian gas. The Algerians have already begun to show some flexibility in contract terms and will probably become increasingly responsive in the early 1990s.

- To maintain an adequate resource base to meet rising demand and avoid significantly greater reliance on Soviet gas after the year 2000, Western Europe must ensure that government policies allow the private sector to maintain an adequate exploration program. Because of the potentially long lead-times involved, European gas needs of the next century will be met, in large part, from the reserves discovered in the next 10 years. [redacted] 25X1

In the absence of these measures, market realities dictate that Soviet gas will be bought. Failure to find acceptable alternatives to Soviet gas will leave many West European countries with few options to meet their commitments under the May 1983 IEA/OECD Ministerial agreement. If indigenous resources are not developed promptly, these countries would have to abandon the IEA/OECD commitment or take action—such as implementing a system of tariffs or quotas—to restrict Soviet supplies to agreed levels. We believe opposition to a system of tariffs and quotas would make this approach very difficult to implement even if political pressure were applied.

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On balance, we believe that Western attitudes and Moscow's marketing strategy will lead to additional purchases of Soviet natural gas. Concerns over significant dependence on Soviet imports, as well as commercial prudence in seeking diversified sources of gas, should help limit the size of additional purchases. Nevertheless, if substantial progress on the development of indigenous Western gas resources is not achieved over the next few years because of weak demand, the high price of new gas, and stringent Norwegian tax policies, Soviet gas may make significant further inroads. Thus far the West Europeans have shown little indication of taking steps to prevent this outcome.

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Appendix

Major West European Natural Gas Consumer Supply and Demand Balances

Table A-1
West Germany:
Natural Gas Supply and Demand, 1984, 1990, 2000, and 2010 [a]

	1984 [b]	1990	2000	2010
Demand	53	58	67	78
Production	18	17	14	13
Import demand	35	41	53	65
Contracted supplies	38	45-48	45-48	24-27
USSR	14	20-23	20-23	20-23
Netherlands	16	15	15	
Norway	8	10	10	4
Shortfall (surplus)	(3)	(4-7)	5-8	38-41

[a] *Billion cubic meters.*
[b] Estimated.

Table A-2
France:
Natural Gas Supply and Demand, 1984, 1990, 2000, and 2010 [a]

	1984 [b]	1990	2000	2010
Demand	28	30	35	41
Production	6	4	2	1
Import demand	22	26	33	40
Contracted supplies	23	31-33	31-33	24-26
USSR	5	11-13	11-13	11-13
Netherlands	7	7	7	
Norway	2	4	4	4
Algeria	9	9	9	9
Shortfall (surplus)	(1)	(5-7)	0-2	14-16

[a] *Billion cubic meters.*
[b] Estimated.

Table A-3
Italy:
Natural Gas Supply and Demand, 1984, 1990, 2000, and 2010 [a]

	1984 [b]	1990	2000	2010
Demand	32	38	45	52
Production	13	13	12	11
Import demand	19	25	33	41
Contracted supplies	20	30-32	30-32	24-26
USSR	8	11-13	11-13	11-13
Algeria	7	12	12	12
Netherlands	5	6	6	
Libya		1	1	1
Shortfall (surplus)	(1)	(5-7)	1-3	15-17

[a] *Billion cubic meters.*
[b] Estimated.

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Table A-4
Belgium and Luxembourg:
Natural Gas Supply and Demand, 1984, 1990, 2000, and 2010 [a]

	1984 [b]	1990	2000	2010
Demand	9	10	12	13
Production				
Import demand	9	10	12	13
Contracted supplies	9	8-10	8-10	3-5
Netherlands	5	3	3	
Norway	2	2	2	
Algeria	2	3-5	3-5	3-5
Shortfall (surplus)		0-2	2-4	8-10

[a] *Billion cubic meters.*
[b] Estimated.

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Table A-5
United Kingdom:
Natural Gas Supply and Demand,
1984, 1990, 2000, and 2010 [a]

	1984 [b]	1990	2000	2010
Demand	52	58	58	58
Production	38	50	45	41
Import demand	14	8	13	17
Contracted supplies	14	12		
Norway	14	12		
Shortfall (surplus)		(4)	13	17

[a] *Billion cubic meters.*
[b] Estimated.

Table A-6
Netherlands:
Natural Gas Supply and Demand,
1984, 1990, 2000, and 2010 [a]

	1984 [b]	1990	2000	2010
Demand	36	32	32	32
Production	70	63	63	32
Import demand	(34)	(31)	(31)	
Shortfall (surplus)	(34)	(31)	(31)	

[a] *Billion cubic meters.*
[b] Estimated.

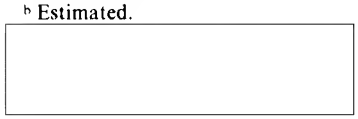

Table A-7
Norway:
Natural Gas Supply and Demand,
1984, 1990, 2000, and 2010 [a]

	1984 [b]	1990	2000	2010
Demand [c]				
Production	29	28	16	8
Import demand	(29)	(28)	(16)	(8)
Shortfall (surplus)	(29)	(28)	(16)	(8)

[a] *Billion cubic meters.*
[b] Estimated.
[c] Negligible.

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